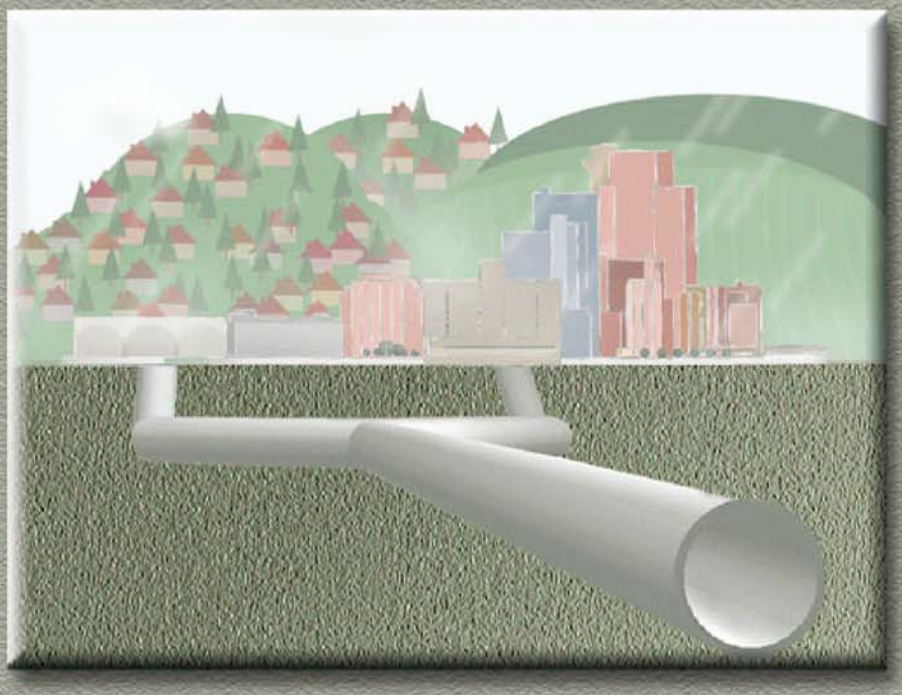
# - CSI PROJECT -

# SOUTH SAMMAMISH BASIN

## PHASE 2
## SUBREGIONAL PLANNING REPORTS

**October 2003**



King County

Department of
Natural Resources and Parks
**Wastewater Treatment Division**

# CSI PROJECT SOUTH SAMMAMISH BASIN
# PHASE 2 SUBREGIONAL PLANNING REPORTS

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# KING COUNTY CONVEYANCE SYSTEM IMPROVEMENT PROJECT

# EXECUTIVE SUMMARY

# SOUTH SAMMAMISH BASIN PLANNING SUMMARY

**OCTOBER 2003**

# EXECUTIVE SUMMARY

King County's Conveyance System Improvement (CSI) project evaluates the regional wastewater conveyance system infrastructure by forecasting future demands, examining system capacity and planning wastewater service improvements. The *Task 140 Prioritization of Subregional Planning Areas* report described the South Sammamish basin as a high growth area that will experience capacity limitations in the next 20 years. The report also noted operation and maintenance concerns at the Sunset and Heathfield Pump Stations. For these reasons, the South Sammamish basin was given a high priority for wastewater planning. The CSI project's evaluation of the South Sammamish basin consists of six reports that provide background information on planning history, existing infrastructure and environmental characteristics (Task 210, 220, 230), alternatives development and refinement (Task 240, 250), and a planning summary report (Task 260).

## PLANNING BASIN BACKGROUND

The South Sammamish basin covers nearly 48 square miles in east King County around the southern half of Lake Sammamish. The basin includes parts of three incorporated cities (Bellevue, Issaquah, and Sammamish[1]) and unincorporated King County, and covers five King County drainage basins: Lake Hills, Eastgate, Sunset, Issaquah, and Sammamish Plateau. Downstream of the South Sammamish basin, wastewater is conveyed through the Lake Hills Interceptor and Eastside Interceptor to the South Plant in Renton for treatment.

The basin is currently predominantly zoned for residential development, but substantial commercial areas exist in downtown Issaquah, near the Eastgate interchange in Bellevue, and along 228$^{th}$ Avenue in Sammamish. Most of Bellevue lying within the South Sammamish basin has been developed for some time, and the rapid growth that Bellevue experienced in the 1970s and 1980s has slowed. Growth rates in Issaquah and Sammamish are among the highest in King County. Two large developments are underway in Issaquah, but no further large-scale developments are planned there. The Sammamish Plateau is expected to grow to the extent of developable land.

## WET WEATHER FLOW AND SYSTEM CAPACITY

Peak wet weather flow predictions and the conveyance system's existing capacity largely determine the need and timing of future upgrades. Based on expected land development, population growth and sewer deterioration, and flow projections provided by King County, the peak 20-year flow[2] is predicted to exceed the conveyance capacity of King County's

[1] Wastewater service is provided by the Sammamish Plateau Water and Sewer District.

[2] King County's sanitary sewer overflow standard limits overflows to an average of once per 20 years. Therefore the peak 20-year flow is the design flow used to assess the adequacy of the existing system infrastructure.

infrastructure throughout much of the basin within the next 10 to 20 years. Issaquah has undertaken infiltration/inflow (I/I) removal projects (e.g., sliplining city trunk sewers in downtown), but the long-range impacts of the I/I reduction projects have not been quantified.

The following list summarizes when the projected peak 20-year flow will exceed King County's conveyance infrastructure capacity in the basin:

1. The Issaquah Creek Interceptor will begin to experience localized capacity problems by 2010 and widespread capacity limitations by 2020 as development in Issaquah proceeds.

2. The Issaquah Interceptor Sections 1 and 2 will not have enough capacity to convey the peak 20-year storm by 2020. Several of the capacity-limited sections of the Issaquah Interceptor are located within Lake Sammamish.

3. The Sunset and Heathfield Pump Stations will be at capacity by 2010 (assuming the upstream conveyance can deliver all flows to the pump stations).

4. The Eastgate Trunk will be beyond its capacity by 2010 (assuming the upstream conveyance can deliver all flows to the pump stations).

## ALTERNATIVES EVALUATION

The potential flow management schemes developed for the South Sammamish basin recognize the system bottlenecks, patterns of growth in the area, and the impacts to downstream service areas. Located within Lake Sammamish, the Issaquah Interceptor Section 1 is the most challenging bottleneck, because replacing or paralleling the sewer in place is not a viable alternative. Most of the growth in the next several decades is projected to occur in the upper part of the planning area, in Issaquah and the Sammamish Plateau, which will increase flow to the Issaquah Interceptor Section 1.

The alternatives components listed in Table ES-1 are designed improve peak flow management in the basin. The alternative components form a menu of options, from which combinations of alternatives were packaged and evaluated for their effectiveness at meeting the basin-wide goal of controlling the peak 20-year flow, while providing King County with the flexibility to implement a phased construction schedule and allowing for further refinements of the growth forecasts in the future.

**Table ES-1. CSI Alternatives for the South Sammamish Basin**

| Alt. | Category | Alternative Description | How it helps |
|---|---|---|---|
| A | Diversion | Diverting a portion of the Sammamish Plateau north to the NE Sammamish Interceptor | • Reduces flow to downstream facilities |
| B | Diversion | Diverting wastewater away from Sunset PS, north along the west side of Lake Sammamish to the Lake Hills Trunk | • Reduces flow to Sunset and Heathfield PS and Eastgate Trunk |
| C | Flow Mgmt. | Using storage tanks or tunnels to attenuate peak flows | • Reduces peak flow downstream of storage |
| D | Diversion/ Capacity | Divert flow along the I-90 right-of-way to the Eastside Interceptor | • Reduces flow to Sunset and Heathfield PS and Eastgate Trunk<br>• Provides relief to Factoria Interceptor |
| E | Diversion/ Capacity | Construct a land-based sewer to bypass Issaquah Interceptor Section 1 (lake line) | • Increases capacity between Issaquah and Sunset PS<br>• Reduces reliance on in-lake sewer line |
| F | Capacity | Increase capacity of Sunset and Heathfield Pump Stations and Eastgate Trunk | • Removes bottleneck in Bellevue part of basin |
| G | Flow Mgmt. | Targeted I/I reduction in coordination with the County's regional I/I program | • Reduces flow to downstream facilities |
| H | Flow Mgmt. | Reclaimed water production and discharge in the basin | • Reduces flow to downstream facilities |
| I | Diversion | Reroute the Issaquah Highlands drainage away from the Issaquah Creek Interceptor | • Reduces flow to facility that would be beyond capacity in 2010 and is located in heavily commercial ROW |

## DESCRIPTION OF WORKING ALTERNATIVE

The alternatives comprising the Working Alternative focus on *reducing* the peak flow in the Issaquah Interceptor Section 1 (lake line) and downstream facilities. The reduction in peak flow is accomplished through a combination of flow diversion, peak flow storage, and I/I control measures. The following alternatives are included in the Working Alternative:

- Alternative A: Diverting a portion of the Sammamish Plateau Water and Sewer District flow to the NE Sammamish Interceptor.

- Alternative I: Divert flow from the Issaquah Highlands development away from Issaquah Creek Interceptor.

- Alternative C: Store peak flow in Issaquah and Sammamish Plateau to attenuate flow.

- Alternative G (optional): Reduce I/I in areas of Issaquah that drain to the Issaquah Creek Interceptor. In lieu of I/I control, King County could reduce flow demand by constructing larger storage facilities.

The components of the Working Alternative could be phased to meet the future peak 20-year flow demands. Table ES-2 lists planning-level construction and total project costs for implementing the Working Alternative (see Task 250 report for details).

**Table ES-2. Working Alternative Project Costs**

| Alternative | Construction Cost [A] | Project Cost [B] | Annual O&M Cost[C] |
|---|---|---|---|
| Sammamish Plateau Diversion north[D] | $9,100,000 | $19,500,000 | $18,300 / year |
| Minor improvements to Sunset & Heathfield PS | $500,000 | $1,100,000 | N/A[E] |
| Issaquah Highlands Relief Sewer[D] | $2,500,000 | $5,400,000 | $7,900 / year |
| Sammamish storage | $8,500,0000 | $18,300,000 | $3,100 / year |
| Issaquah storage | $8,500,0000 | $18,300,000 | $3,100 / year |
| **Working Alternative Total** | **$29,100,000** | **$62,600,000** | **$32,400 / year** |

[A] Construction costs were calculated using Tabula v1.0 with an assumed 2001 Seattle CCI of 7341

[B] Project costs include the following allied costs provided to the CSI project team by King County: sales tax = 8.8% of construction, design engineering = 20% of construction, construction management engineering = 12% of construction, labor = 16.8% of construction, closeout = 1% of labor, other costs = 1% of labor, land and ROW acquisition = 6.5% of construction, contingency = 30%.

[C] For details, see Operation and Maintenance Assumptions section of this report

[D.] Assumes the most expensive of the routes identified.

[E] The minor capacity improvements at the Sunset and Heathfield Pump Stations would only be used in extreme storm events. As a result, the CSI project team expects there would not be a measurable increase in pump station operation and maintenance.

## IMPLEMENTATION SCHEDULE

The Working Alternative can be implemented in phases to give King County staff an opportunity to revisit the alternative components and fine tune the facility sizes to match actual development in the service area and to incorporate the impacts of specific I/I removal programs. Figures ES-1 and ES-2 provide a preliminary implementation schedule based on the current flow projections. The figures show how implementing the Working Alternative will reduce peak flows and increase system capacity in order to meet the projected future flow increases associated with expected development in the South Sammamish basin. Figure ES-1 shows flow to Section 1 of the Issaquah Interceptor, and Figure ES-2 shows flow to the Sunset Pump Station, which includes Issaquah, Sammamish Plateau and contribution to the lake line from Bellevue basin 3. The first phase project will need to maintain capacity in the Issaquah Creek Interceptor and be completed before 2010. Later phases can be implemented as flow monitoring data indicate that the additional improvements are needed.

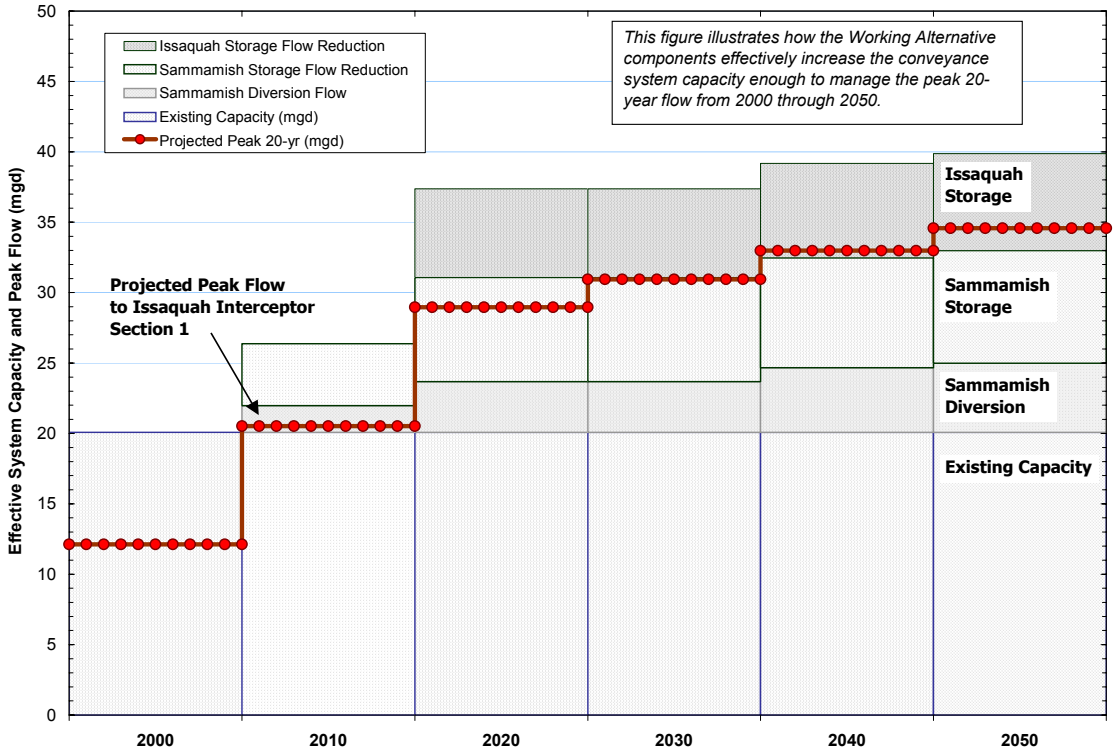


**Figure ES-1. Working Alternative System Capacity: Issaquah Interceptor Section 1**

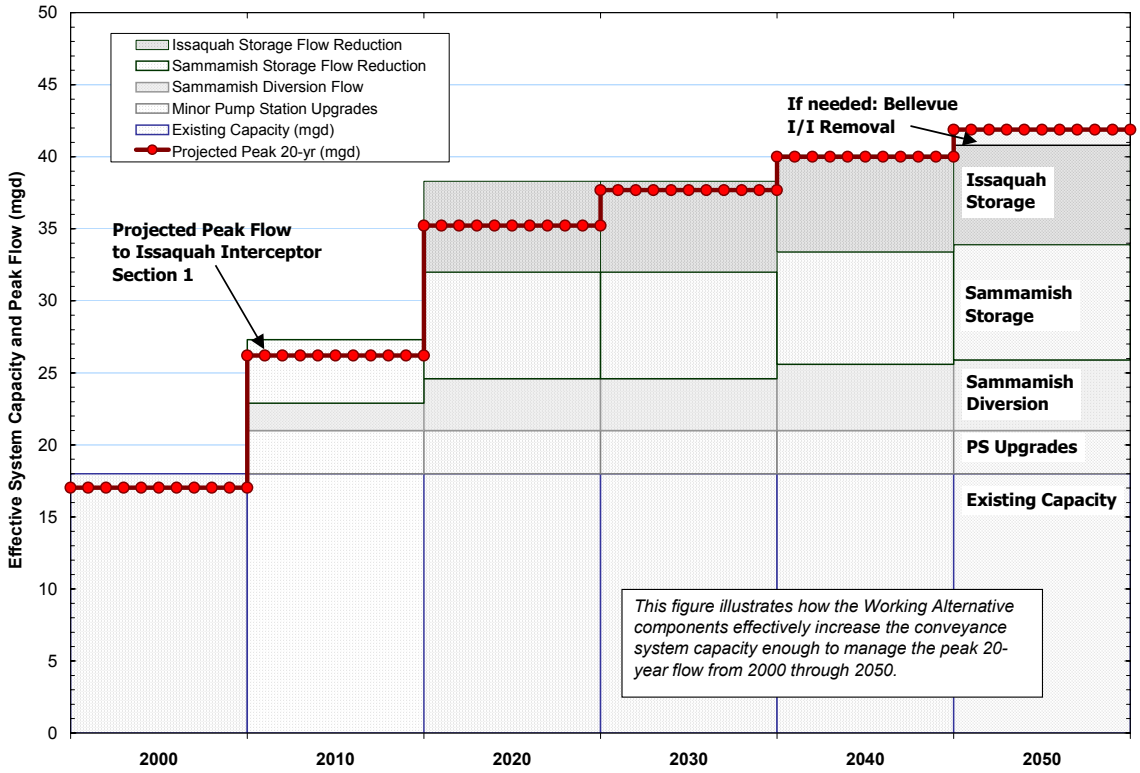


**Figure ES-2. Working Alternative System Capacity: Sunset and Heathfield P.S.**